REMARKS/ARGUMENTS

Favorable reconsideration of the Application as presently amended and in light of the following discussion is respectfully requested.

This Amendment is in response to the Office Action mailed on October 6, 2003. Claims 18-34 are pending in the application and Claims 18-31, 33, and 34 stand rejected. Claim 32 has been objected to as being dependent upon rejected base claims, but would be allowed if rewritten in independent form. The indication of allowable subject matter is noted with appreciation. Applicants have amended Claims 18, 19, 20, 22, 29, and 32, and submitted new Claims 35-38.

In view of the allowable subject matter, Applicants have rewritten Claim 32 in independent form, including all of the limitations of claims from which it depended. Therefore, Applicants respectfully submit that Claim 32 is in condition for allowance.

The Specification was objected to because the use of the term "isostatic" deviates from its accepted meaning without clearly defining it. Applicants respectfully disagree for at least two reasons. First, the meaning of the term has been defined in Applicants' Specification. Secondly, use the term in Applicants' Specification is the same as the use by others of ordinary skill in the art.

Applicants respectfully submit that the meaning given to the term has been properly defined on page 1, lines 13-17 of Applicants' Specification, i.e., "isostatic positioning constitutes precise and repeatable positioning." Applicants respectfully submit the following citation from the M.P.E.P. § 2106(II)(C) (emphasis added):

> "Office personnel must rely on the applicant's disclosure to properly determine the meaning of terms used in the claims. *Markman v. Westview Instruments*, 52 F.3d 967, 980, 34 USPQ2d 1321, 1330 (Fed. Cir.) (*en banc*), *aff'd*, U.S. , 116 S. Ct. 1384 (1996). An applicant is entitled to be his or her own lexicographer, and in many instances will provide an explicit definition for certain terms used in the claims. Where an explicit definition is provided by the applicant for a term, that definition will control interpretation of the

> term as it is used in the claim. *Toro Co. v. White Consolidated Industries Inc.*, 199 F.3d 1295, 1301, 53 USPQ2d 1065, 1069 (Fed. Cir. 1999)"

In addition, as shown on the enclosed materials found in the internet (http://cadrm.roma1.infn.it/atlas/sup_descript.htm) and on other U.S. patents, "isostatism," "isostatic," and "isostatically" are words used in construction and manufacturing to describe the relative position of two pieces with respect to each other dictated by a number of conditions given by the geometry of the application. Consider, for example, the following statements using these terms in U.S. Patent No. 6,208,912, issued on March 21, 2001: (1) "three supports 13 combine to define a substantially isostatic constraint between wall 12 and flange 10, and prevent any movement (translation and rotation) in a plane perpendicular to axis A" (U.S. Patent 6,206,912, col. 3, lines 8-11, emphasis added), and (2) "supports 13 define an isostatic constraint for ensuring maximum [repeatable] positioning of head 1 with respect to supporting member 3" (*Id.*, col. 5, lines 1-3, emphasis added).

Based on the existing definition in Applicants' Specification, the above-summarized rule currently in vigor, and the use for the terms in question currently found in the open literature, Applicants respectfully request reconsideration of the objection to Applicants' Specification.

Claims 18-34 are objected to because of several informalities. Applicants respectfully submit that the informalities noted with respect to Claims 22 and 33 have been corrected by the present amendment and respectfully request reconsideration of the same.

Claims 18-34 are rejected under 35 U.S.C. §112, first paragraph, because of the use of the terms "isostatic" and "isostatically" in the claim language. As previously explained in conjunction with the outstanding objection of Applicants'

Specification, Applicants respectfully submit that the use of the terms in question is proper, has been clearly defined in Applicants' Specification, and is in agreement with similar uses by others of ordinary skill in the art. Based at least on these reasons, Applicants respectfully request withdrawal of the rejection of Claims 18-34 under 35 U.S.C. §112.

Claims 18-31, 33 and 34 are rejected under 35 U.S.C. §102(b) as being anticipated by Hodapp (U.S. Patent No. 3,608,935, hereinafter "Hodapp"). Applicants respectfully submit that the presently amended independent Claim 18 is not anticipated by Hodapp because each and every element as set forth in that claim is not found, either expressly or inherently described, in the cited reference. In an anticipation rejection, MPEP § 2131 requires that the identical invention must be shown in as complete detail as is contained in the claim.

According to a feature of the invention as set forth in the presently amended Claim 18, a device for isostatically positioning a moving part with respect to a fixed part is recited, comprising means for generating a force opposing a loss of contact of a plurality of points of isostatic contact between the moving part and the fixed part so as to lock the position.

As disclosed in the Specification, the inventors have discovered a novel and non-obvious apparatus to precisely and repeatedly position a moving part with respect to a fixed part by reducing the numbers of ergonomic maneuvers required, making the claimed device less complicated and reducing the length of time required to connect and disconnect the parts (Specification, page 1, line 19 – page 2, line 13). Applicants respectfully submit that Claim 18 recites such an apparatus.

Hodapp discloses a fastener device 14 that includes a helmet-mounted-fastener member 50 and a fastener member 52. The fastener member 52 is a

cylindrical tube sleeve of metal. The member 50 includes a base part 66, having a threaded hole 68, secured to the helmet 10 by threaded bolts. The fastener member 50 also includes a cylindrical tube 70 having a conical lip 72 in order to provide a seal when members 50 and 52 are fitted together. Between the conical lips, a rubber grommet 76 situated on a circular groove in the lip 60 is disposed. The member 52 contains a hollow threaded post 80, a moveable element 82, an outer bottom 84, an annular disc 86, an annular pedestal 88, and an annular base 90. Three equispaced-axially oriented slots or recesses 100 formed in the periphery of the pedestal 88 are each designed to accommodate therein a respective latch member 102 and an associated latch spring 104. Each latch member 102 is pivoted in the center of a respective latch pin 106 resting in a respective cord-like slot 108 formed in the pedestal 88. Each latch member 102 includes a hooked end 112 that is caught axially on a radial surface 114 of the conical lip 72 when both fastener members are joined (Hodapp, col. 2, line 45 – col. 3, line 36). When it is desired to detach the display unit 12 from the helmet 10, the flange 58 from the fastener members 52 is simply encircled by the fingers of the right hand of a user to grip the member while the right thumb is pressed against the outside face of the bottom 84 towards the helmet 10 to release the member 52 from the member 50 by a cam-like actuation of the latch member 102 (*Id.*, col. 4, lines 49-53).

Applicants respectfully submit that presently amended Claim 18 is not anticipated by Hodapp. This cited prior art reference does not disclose, among other limitations, means for generating a force opposing a loss of contact of a plurality of points of isostatic contact between the moving part and the fixed part so as to lock the position which is equivalent to the structure disclosed in the specification for performing this function. As provided by statute, an element in a claim for a

combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof (35 U.S.C. §112, sixth paragraph).

As explained in Applicants' Specification, and illustrated in FIG. 6 of this application by way of an example and not of a limitation, the force generating means recited in Claim 18 comprises the generation of a retaining force having a direction that is off-axis to the direction of translation of the moving part with respect to the fixed part. In addition, the force necessary to disengage the locked parts is substantially perpendicular to this translation direction. Advantageously, such a retaining force maintains precisely and repeatedly the locked position of the moving part with respect to the fixed part, thus avoiding the possibility of any force, particularly a force in the direction of translation between the parts, to cause the moving part to move with respect to the fixed part. It is possible to change the characteristics of the force generating means by the orientation and coefficient of friction characteristics of the design of a locking member so as to require a significant force to effect disengagement (Specification, page 10, lines 7-20).

Hodapp does not teach or disclose such a force generating means. In Hodapp, as summarized hereinabove, both the retaining and the disengagement forces are parallel to the axis of translation of the moving part 52 and the fixed part 50. Therefore, at least based on the provisions of 35 U.S.C. §112, sixth paragraph, Hodapp cannot anticipation the invention recited in Claim 18. In addition, Claims 19-31, 33, and 34 are allowable, among other reasons, as depending either directly or indirectly from Claim 18, which is allowable.

In addition, contrary to the assertions made in the outstanding Office Action, Applicants respectfully submit that the following claims are not anticipated by Hodapp.

As to Claim 19, Hodapp does not disclose bases of the female and mail dovetails in contact with each. The outstanding Office Action asserts that these recited bases are anticipated by elements 66 and 94. Elements 94 are weight-saving holes in the moving part 52, having a base element 90, which clearly does not contact the base part 66 of the fixed part 50 (see, for example, FIG. 3 of Hodapp, illustrating that element 90 and 66 do not contact each other).

As to Claim 21, the direction of the force holding the moving part to the fixed part in Hodapp is not parallel to the asserted bases 66 and 94, but it is actually perpendicular thereto. The outstanding Office Action has taken "a direction of force" to mean any arbitrary chosen direction. Applicants respectfully submit that Claim 21 is referring to the direction of the force generated by the force recited in Claim 18, from which Claim 21 depends.

As to Claim 23, Applicants respectfully submit that Hodapp does not disclose, near a contact between the finger and the surface of the fixed part, a substantially convex finger. FIG. 3 of Hodapp clearly shows that the surface of element 102 in contact with the surface 114 of the fixed part is substantially planar.

As to Claim 26, Hodapp does not disclose a translation movement of the finger being limited in both directions of translation with respect to the moving part. The outstanding Office Action asserts that the tip of element 112 anticipates the claimed finger. However, with respect to the moving part in Hodapp, element 112 has not translation. Given the pinned connection 106, element 102 can only rotate with respect to the moving part 52.

As to Claim 30, Applicants respectfully submit that elements 76 (a grommet) and 60 (the metallic lip of the moving part 52) of Hodapp do not anticipate the facet and elastic elements recited therein. First, Hodapp disclosed no translation of the grommet 76 along an axis of translation of the tip of element 112 roughly perpendicular to the axis of translation of the moving and fixed parts. As already explained, there cannot be any translation of the pinned element 102 with respect to the moving part. Secondly, Applicants respectfully submit that the level of force required to deform a metallic element elastically is simply not existent in the invention of Hodapp without placing at risk the life of a potential user thereof because, in order for a metallic lip to be elastic, assuming a steel lip having a Young's Modulus of Elasticity of approximately 30,000,000 lbf/in^2, the force required to elastically deform such an elastic member would be several orders of magnitude larger than the manual force required of the user to release the display unit from the helmet in Hodapp.

As to Claim 31, Applicants respectfully submit that Hodapp does not disclose the recited subject matter. The outstanding Office Action asserts that the axis of translation of the tip of element 112 (asserted as a finger) is coincident with an axis of translation of the moving element 52 and that the second elastic element 60 (the metallic lip of the moving element 52) tends to separate the moving element 50 from the asserted finger element 112. Applicants respectfully submit that there is no relative translation between elements 50, 112, and 60 of Hodapp. Lip 60 of Hodapp is integral to the moving part 50. In the rejection of Claim 30, the grommet 76 was identified as the moving element recited in Claim 31; however, the grommet 76 was not mentioned in the rejection of Claim 31.

As to Claim 33, the outstanding Office Action asserts that a force 600 is used to unlock the fixed part from the moving part. However, as clearly explained in Hodapp (Hodapp, col. 4, lines 49-52), the release force is generated by pressing the user's thumb against the outside face of the button 84, i.e., perpendicularly to the asserted direction 600.

Therefore, based at least on the above-summarized reasons, Applicants respectfully request that the anticipation of Claims 18-31, 33, and 34 under 35 U.S.C. §102(b) be withdrawn and the claims passed to issuance.

Applicants have submitted herein new Claims 35-38. Support for the subject matter recited in the newly submitted claims is found in the original claims and figures of the as-filed Specification. Based at least on the reasons hereinabove discussed in conjunction with the anticipation rejection based on Hodapp, Applicants respectfully submit that Hodapp does not anticipate the invention recited in Claims 35-38.

Based at least on the foregoing reasons, Applicants believe the present application is in condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
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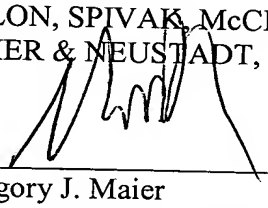

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ATTACHMENT 1
MDT/RPC Common Supports
DESCRIPTION

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This section describes the technical concept of supports common to MDTs and RPCs.

Common Supports are structures which connect together MDT and RPC chambers in order to make a module to be installed onto the barrel railsystem.
They are composed of two frames, one at each end (in X) of a module.

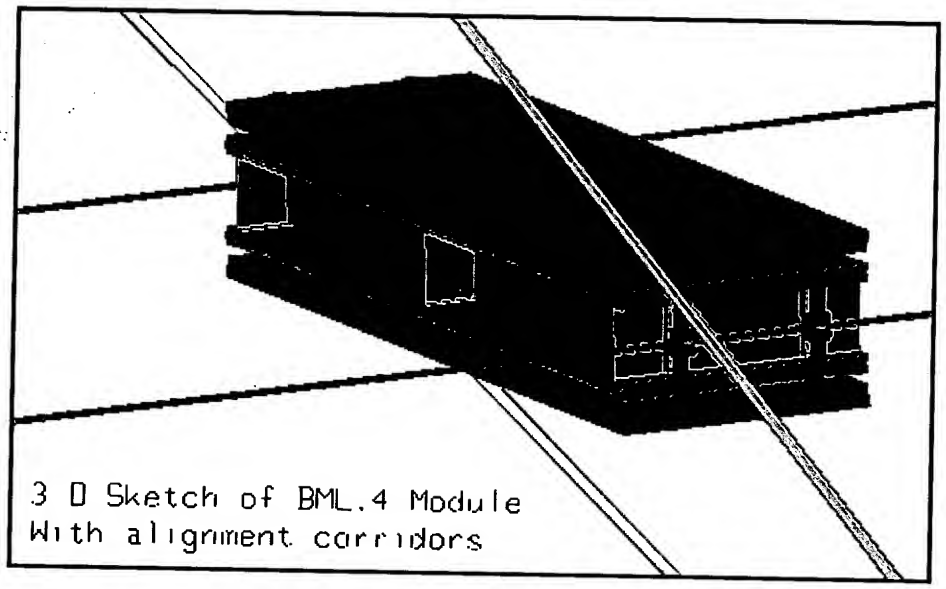

Figure 1

Common Supports are foreseen for layers **BMS**, **BML**, and **BOL** ; they must achieve the following requirements :

- o Isostatic supporting scheme for MDTs
- o Connection to the barrel railsystem
- o Minimization of the loads applied onto the RPCs
- o Absorption of RPC dilatations
- o Simplification of the installation procedure

MDT Isostatism

The connection between MDTs and supporting frames does not change at all the three points isostatic mounting concept (see Fig. 2) :

- On the ReadOut side, there are 2 connection points with the supporting frame.
  - At the connection point closest to the chamber coordinate system, all rotations remain free while all translations are blocked.
    This gives the position in Z of the chamber.
  - At the second connection point, only UX and UY translations are blocked.
    This gives the position in X of the chamber, and blocks its rotations around X and Y axes. It leaves the chamber free to dilatate along Z.
- On the High Voltage side, there is one connection point with the supporting frame. Only UY translation is blocked.
  This gives the chamber its Y position,the freedom to dilatate along X, and blocks its rotation around Z axis.

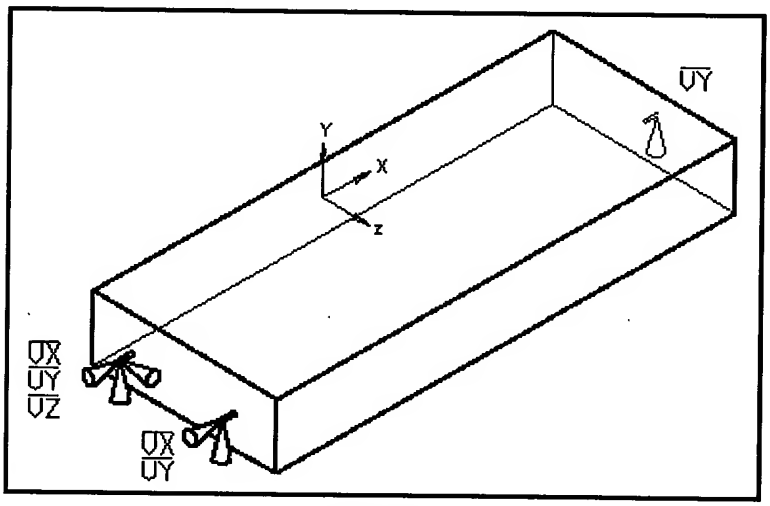

Figure 2

At each of the 3 mounting points the principle of bushing on rail (used for all other MDTs not connected to supporting frames) is maintained by using a pin which can be either part of the supporting frame (bushing part of the chamber), or part of the chamber (pin part of the supporting frame) :

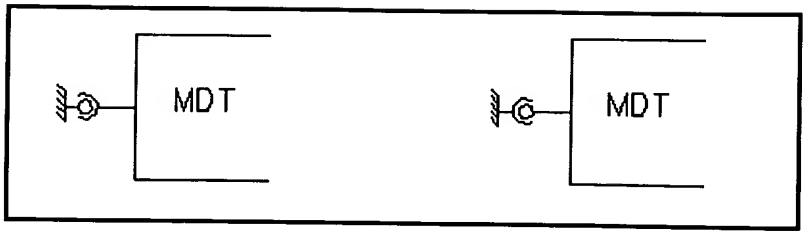

Figure 3

RPC and Barrel Connection

Figure 4 shows in 2D the kinematics of the supports.

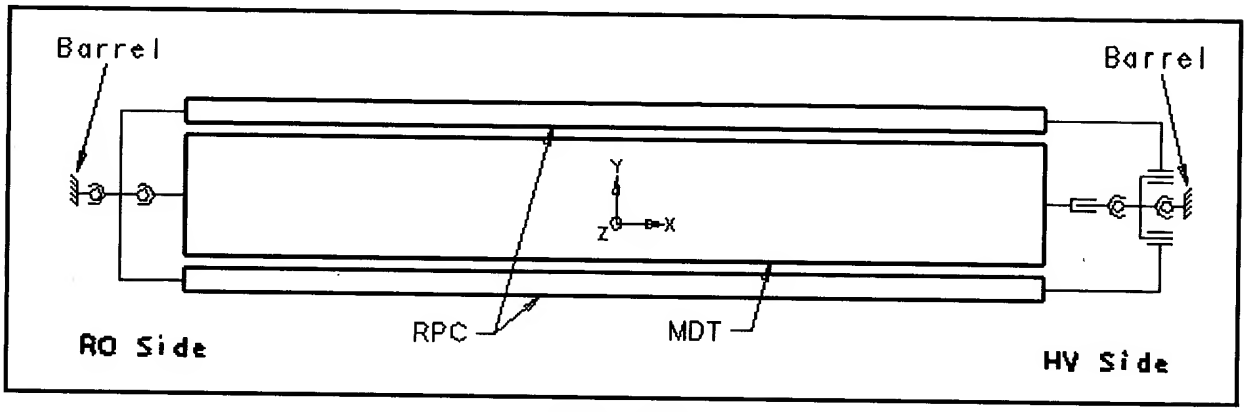

Figure 4

- The connection between barrel rails and supporting frames follows the same principle as the MDT/frames connection, with the difference that no UX freedom on the HV side is needed. Two connection points can also be envisaged on that side.
- The RPCs are 'rigidly' connected to the frame on the RO side; on the other side the connection between frame and RPCs leaves only UX translation free. This prevents the supporting frames from rotating around the barrel rails : the RPCs act like spacers between the two supporting frames.

The table below summarises the degrees of freedom between components left at each mounting point :

Side	Read Out		High Voltage
Connection Point	1	2	3
MDT / Frame	RotX RotY	RotX RotY	UX RotX RotY

	RotZ	UZ RotZ	UZ RotZ
RPC / Frame			UX
Frame / Barrel	RotX RotY RotZ	RotX RotY UZ RotZ	RotX RotY UZ RotZ

RPC Loads

As presented above, the RPCs become part of the supporting system. This means that the weight of the MDT will add an extra-load on the RPCs, which is maximal in horizontal positions (sectors 5 and 13) and null in vertical positions (sectors 1 and 9). FE calculations show that this extra-load is acceptable for BML and BMS sectors. For BOL sectors RPCs do not even stay within their envelope due to their own weight ; an RPC stiffening structure will have to be added, and maybe also a "charriot" connecting the supporting frames.

Common supports are "sector independent" ; the same supporting frames will be used for all sectors of a station (except foot sector 13).
Mechanically, this means that the loads have to be distinguished between the influence of the Y component of the weights and the X component.
The influence of the Y component has just been described ; now let's consider the X component.
Let us consider so sectors 1 and 9, where the chambers are vertical, and the X component of the weights is maximal. If we suppose, for example for BOL station, that there are no common supports (Fig. 5), then the RPC is loaded with a very high moment created by the distance between the RPC midplane and the rail center, i.e. by the distance between MDT and RPC midplanes. By using common supports, we can optimise the Y position of the rails (Fig. 6) in such a way that the weight of the MDT balances the weight of the RPC, and so no moment is taken by the RPC.

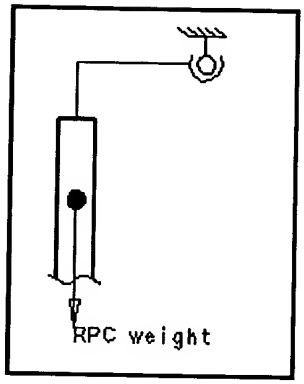

Figure 5

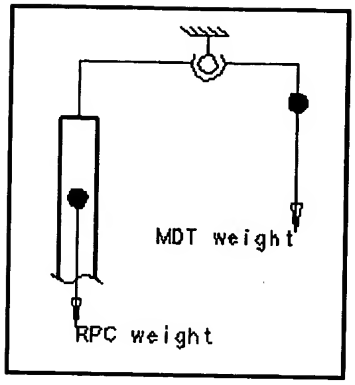

Figure 6

The graph below shows the evolution of the theoretical moments applied onto BOL RPC in function of the azimuthal position. Common supports divide by nearly 3 the highest moment, compared to separate supports.

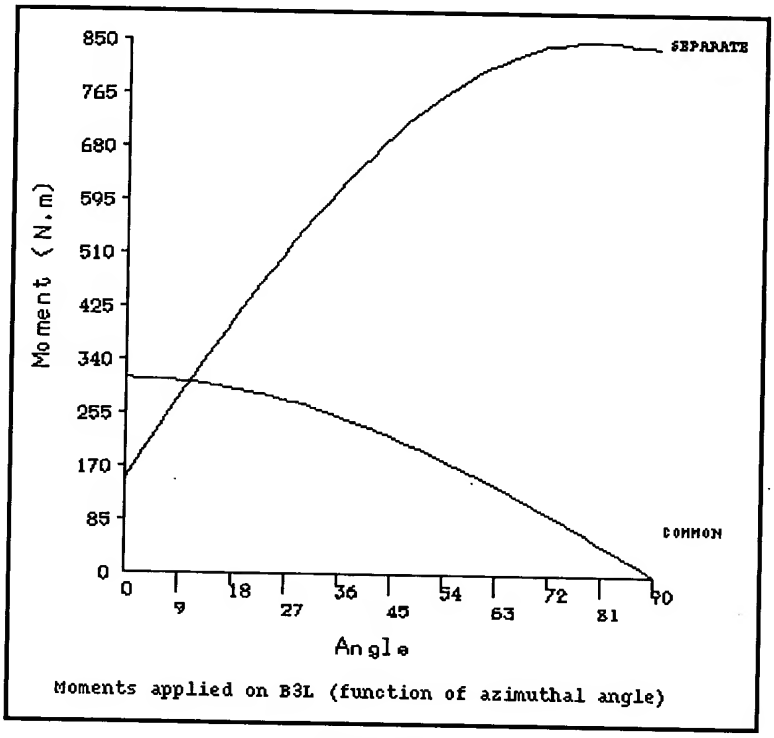

Figure 7

Open Points

Some information is still missing for doing real design of the supporting frames :

1. **Damping**
   A damping system is envisaged, and 20 mm have been left free on the layout for it. It is necessary to have more information on the shape of this

damping system.

2. **RPC mechanical structure**
   As long as no real mechanical design of the RPCs is done, it will not be possible to know how to connect them to the supporting frames.
3. **BOL RPC Stiffness**
   FE calculations show that RPCs for BOL stations, put horizontally and simply supported at their ends have a sag of more than 10 mm. They are not stiff enough to remain in their envelope. Due to the small distance which separates BOL and BOS stations on the layout, it will be hard to make them stiffer.
4. **HV frame connection points**
   The connection of the supporting frames to the barrel rails follows the same rules as for the MDTs, i.e. 2 points on the RO side and 1 on the HV side.
   As the bushings used are self aligning, the HV frame could rotate around the chamber X axis. This rotation should be impeached by the RPCs. As we do not know exactly their stiffness in rotation, and the tolerance on their planarity, the result could be a movement of the RPCs extremities up to ~15 mm in Y.
   Prototyping will show wether this problem might appear. In that case HV frames will have two connection points to the barrel.

Last update : 9.09.98 by Alvise